REMARKS

Entry of the foregoing and reexamination and reconsideration of the subject application, as amended, pursuant to and consistent with 37 C.F.R. § 112, are respectfully requested in light of the following remarks.

The specification has been amended to correct the structure of one of the possible members of the central core. The location of the double bond in the structure was inadvertently drawn incorrectly and resulted in a structure where a phosphorus in the ring was bonded to two nitrogen atoms, with each of these bonds being a double bond, and to two methyl groups. This results in the phosphorus atom having a non-allowed valence. The amended structure corrects this problem and is consistent with the ring structures of the other two aromatic cores from which the central core can be selected.

Claims 54-91 and 94-107 are present in this application. Claims 1-53 were previously cancelled. Claims 54-88 remain under consideration in this application. Claims 89-91 and 94-106 have been withdrawn from consideration by the Examiner as being drawn to non-elected groups in a restriction requirement. Claims 92 and 93 have been cancelled in this amendment without prejudice or disclaimer. Applicants expressly reserve the right to file one or more continuation and/or divisional applications directed to any of the cancelled subject matter. Claim 107 has been added.

Claim 58 has been amended to correct the structure of one of the possible members of the central core. This amended structure is the same structure amended in the specification as described above. Claims 64, 70, 72, 74, 75, 79, 80

and 84-88 have been amended to define each of the variables in each of the claims. Claim 67 has been amended to replace "oxygen" with "hydrogen". Support for this amendment is found in the specification at least on page 7, lines 27-28. Claims 75 and 100 have been amended to add -C(=O)- to the definition of K. Support for this amendment is found in the specification at least on page 8, line 30-page 9, line 5. Claim 84 was also amended to incorporate formulas (C1) and (C2) into the claim.

Claim 107 has been added. Support for this claim is found in Examples 26, 29 and 32 of the specification.

No new matter has been introduced as a result of the foregoing amendments.

Applicants note for the record that the withdrawn claims have not been cancelled because the claims under consideration are composition claims and the withdrawn claims are directed to process of manufacturing and using the compositions under consideration. The withdrawn claims may be amended as needed during further prosecution of the claims under consideration so that the withdrawn claims comprise the required elements to allow for rejoinder of the withdrawn claims upon allowance of the claims under consideration.

Claim Objections

Claims 87 and 88 have been objected to because there is an extra "$]_2$" on the right hand sides of formulas (I-2) and (I-3).

Claims 87 and 88 have been amended to delete the extra "$]_2$" on the right hand sides of formulas (I-2) and (I-3).

Applicants request that these objections should be withdrawn.

35 U.S.C. §112, first paragraph rejection

Claim 67 has been rejected under 35 U.S.C. §112, first as failing to comply with the enablement requirement.

The Office Action indicates that an oxygen atom at the D component of formula C1 in Claim 64 would give the adjacent carbon atom a valence of 5.

Claim 67 has been amended to recite "wherein D represents a hydrogen atom."

Applicants respectfully submit that Claim 67 complies with the enablement requirement and the rejection should be withdrawn.

35 U.S.C. §112, second paragraph rejection

Claims 64, 78 and 84-88 have been rejected under 35 U.S.C. §112, second paragraph as failing to particularly point out and distinctly claim the subject matter which the applicant regards as the invention.

1. Claims 64 and 85-88 have been rejected because allegedly the multitude of variables and possible chemicals listed as suitable for each variable is so large and diverse that the scope of the claims becomes indefinite.

Applicants direct the Examiner to § 2173.04 of the MPEP, which states:

> **2173.04 Breadth Is Not Indefiniteness**
>
> Breadth of a claim is not to be equated with indefiniteness. *In re Miller*, 441 F.2d 689, 169 USPQ 597 (CCPA 1971). If the scope of the subject matter embraced by the claims is clear, and if applicants have not otherwise indicated that they intend the invention to be of a scope different from that defined in the claims, then the claims comply with 35 U.S.C. 112, second paragraph.

The scope of the subject matter embraced by the claims is clear. Each element of each of these claims has been clearly defined in the claims and applicants have not otherwise indicated that they intend the invention to be of a scope different from that defined in the claims. Therefore Claims 64 and 85-88 comply with 35 U.S.C. §112, second paragraph.

2. Claim 78 recites the limitation "-C(D)=N-N(E)-$(Alk)_a$-" in line 2. The Office Action indicates that there is insufficient antecedent basis for this limitation.

Claim 78 depends from claim 75, which defines L as:

> L represents a linear or branched hydrocarbon chain having from 1 to 6 chain members and optionally having one or more double or triple bonds, each of said chain members optionally being a heteroatom, each chain member being optionally substituted by one or more substituents selected from -Alkyl, -Hal, -NO_2, -NRR', -CN, -CF_3, -OH, -OAlkyl, -Aryl, and -Aralkyl,

The limitation "-C(D)=N-N(E)-$(Alk)_a$-" meets the definition of L in Claim 75 because "-C(D)=N-N(E)-$(Alk)_a$-" comprises a linear or branched hydrocarbon chain having from 1 to 6 chain members and optionally having one or more double or triple bonds, each of said chain members optionally being a heteroatom. The limitation "-C(D)=N-N(E)-$(Alk)_a$-" comprises a chain of "-C=N-N-$(Alk)_a$-", which is: (1) a a linear or branched hydrocarbon chain having from 1 to 6 chain members; (2) having one or more double or triple bonds; and (3) each of said chain members optionally being a heteroatom. Therefore limitation "-C(D)=N-N(E)-$(Alk)_a$-" has antecedent basis in Claim 75.

3. Claim 84 recites the limitation " formulae (C1) and (C2), J and K are equal to A and B" in line 2. The Office Action indicates that there is insufficient antecedent basis for this limitation.

Claim 84 has been amended to recite the formulas and the definitions of each of the variables in each of the formulas.

4. Claim 85 recites the limitation "§-{{A-B-C(D)=N-N(E)-(P(=G))<}^{n}[J-K-$(Alk)_a$-N<[A2-P(=O)$(OX)_2]_2]_2\}_m$" in lines 3 and 5. The Office Action indicates that there is insufficient antecedent basis for this limitation.

Claim 85 depends from claim 54, which defines a dendritic polymer comprising (1) a central core § (2) optionally, generation chains branching around the core; (3) an intermediate chain at the end of each generation chain that is present, or at the end of each bond around the core, where appropriate; and (4) a terminal group at the end of each intermediate chain where the terminal group is represented by the formula: -(A1)<[A2-P(=O)$(OX)_2]_2$.

The limitation:

"§-{{A-B-C(D)=N-N(E)-(P(=G))<}^{n}[J-K-$(Alk)_a$-N<[A2-P(=O)$(OX)_2]_2]_2\}_m$

describes an embodiment comprising: (1) a central core (" § "); (2) generation chains (" {{A-B-C(D)=N-N(E)-(P(=G))<}^{n} "); (3) an intermediate chain ("[J-K-$(Alk)_a$- ") at the end of each generation chain ; and (4) a terminal group at the end of each intermediate chain where the terminal group is represented by the formula: -(A1)<[A2-P(=O)$(OX)_2]_2$.

Claim 85 has been amended to clarify the claim by reciting this description.

5. Claim 86 recites the limitation "§-{{A-B-C(D)=N-N(E)-(P(=G))<}^{n}[J-K-C(D)=N-N(E)-$(Alk)_a$-CH<[A2-P(=O)$(OX)_2]_2]_2\}_m$" in lines 3-4 and 5. The Office Action indicates that there is insufficient antecedent basis for this limitation.

Claim 86 depends from claim 54, which defines a dendritic polymer comprising (1) a central core § (2) optionally, generation chains branching around the core; (3) an intermediate chain at the end of each generation chain that is present, or at the end of each bond around the core, where appropriate; and (4) a terminal group at the end of each intermediate chain where the terminal group is represented by the formula: -(A1)<[A2-P(=O)$(OX)_2]_2$.

The limitation:

"§-{{A-B-C(D)=N-N(E)-(P(=G))<}^{n}[J-K-C(D)=N-N(E)-$(Alk)_a$-CH<[A2-P(=O)$(OX)_2]_2]_2\}_m$

describes an embodiment comprising: (1) a central core (" § "); (2) generation chains (" {{A-B-C(D)=N-N(E)-(P(=G))<}^{n} "); (3) an intermediate chain ("[J-K-C(D)=N-N(E)-$(Alk)_a$- ") at the end of each generation chain ; and (4) a terminal group at the end of each intermediate chain where the terminal group is represented by the formula: -(A1)<[A2-P(=O)$(OX)_2]_2$.

Claim 86 has been amended to clarify the claim by reciting this description.

6. Claim 87 recites the limitation "§-{{A'-(C=O)-N(R)-B'-N<}^{n} [A2-P(=O)$(OX)_2]_2\}_m$" in lines 3 and 5. The Office Action indicates that there is insufficient antecedent basis for this limitation.

Claim 87 depends from claim 54, which defines a dendritic polymer comprising (1) a central core § (2) optionally, generation chains branching around the core; (3) an intermediate chain at the end of each generation chain that is

present, or at the end of each bond around the core, where appropriate; and (4) a terminal group at the end of each intermediate chain where the terminal group is represented by the formula: -(A1)<[A2-P(=O)$(OX)_2]_2$.

The limitation:

"§-{{A'-(C=O)-N(R)-B'-N<}^{n} [A2-P(=O)$(OX)_2]_2\}_m$"

describes an embodiment comprising: (1) a central core (" § "); (2) an intermediate chain ("{{A'-(C=O)-N(R)-B'-N<}^{n} "); and (3) a terminal group at the end of each intermediate chain where the terminal group is represented by the formula: -(A1)<[A2-P(=O)$(OX)_2]_2$. The intermediate chain is defined in the specification on page 8,line 30 - page 9, line 6.

Claim 87 has been amended to clarify the claim by reciting this description.

7. Claim 88 recites the limitation "§-{{A''-N<}^{n} [A2-P(=O)$(OX)_2]_2\}_m$" in lines 3 and 5. The Office Action indicates that there is insufficient antecedent basis for this limitation.

Claim 88 depends from claim 54, which defines a dendritic polymer comprising (1) a central core § (2) optionally, generation chains branching around the core; (3) an intermediate chain at the end of each generation chain that is present, or at the end of each bond around the core, where appropriate; and (4) a terminal group at the end of each intermediate chain where the terminal group is represented by the formula: -(A1)<[A2-P(=O)$(OX)_2]_2$.

The limitation:

"§-{{A''-N<}^{n} [A2-P(=O)$(OX)_2]_2\}_m$

describes an embodiment comprising: (1) a central core (" § "); (2) an intermediate chain ("§-{{A''-N<}^{n} "; and (3) a terminal group at the end of each intermediate chain where the terminal group is represented by the formula: -(A1)<[A2-P(=O)$(OX)_2]_2$. The intermediate chain is defined in the specification on page 8,line 30 - page 9, line 6.

Claim 88 has been amended to clarify the claim by reciting this description.

Applicants respectfully submit that Claims 64, 78 and 84-88 particularly point out and distinctly claim the subject matter which the applicant regards as the invention and the request that the rejection of these claims be withdrawn.

Double Patenting

Claims 54, 55, 58, 59, 61-66, 68-70, 72, 75-77 and 80-84 have been provisionally rejected on the ground of non-statutory obviousness-type double patenting as being unpatentable over claims 60, 62-73, 75-78, 80-83 and 88 of co-pending Application No. 10/580,422 as published in U.S. Patent Application Publication 2007/0083034 on April 12, 2007. The Office Action indicates that although the conflicting claims are not identical, they are not patentably distinct from each other because the invention of the instant claims is in effect a "species" of the "generic" invention of the co-pending claims and it has been held that a generic invention is anticipated by the species.

Applicants request that this matter be held in abeyance until such time as one of the applications is otherwise allowable. It is believed to be premature to file a terminal disclaimer before the scope of the claims has been settled. In the event that

the Examiner is ready to allow this application except for this rejection, she is asked to contact the undersigned so that an appropriate terminal disclaimer can be promptly prepared and filed.

35 U.S.C. §102(b) prior art rejections

1. Claims 54, 58-66 and 68-88 have been rejected under 35 U.S.C. §102(b) as being anticipated by Caminade et al. (WO 0053009) as shown in US 6,939,831.

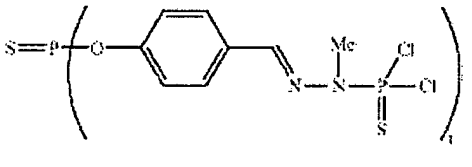
It is well established that in order to demonstrate anticipation over 35 U.S.C. § 102(b), each feature of the claim at issue must be found, either expressly described or under principles of inherency, in a single prior art reference. See, *Kalman v. Kimberly-Clark Corp.*, 218 USPQ 789 (Fed. Cir. 1983).

Caminade discloses dendrimers with a neutral functional group consisting mainly of the phosphonic type. (See col. 12, line 66 - col. 13, line 2) Caminade teaches that their invention is directed towards dendrimers capable of forming a gel. (See col. 1, lines 26 - col. 2 lines 67, col. 3, line 16, col. 12, lines 14-16, and the claims). Caminade discloses dendrimers with an ammonium terminal group as gellable dendrimers, but does not exemplify other types of terminal groups. Caminade teaches using the dendrimers for agricultural uses, but does not teach or suggest using them as surface treating agents, as taught in the instant application. One of ordinary skill in the art of surface protection would not have considered the disclosure of Caminade as being relevant.

Caminade does not teach or disclose two terminal groups at the end of each intermediate chain where each terminal group is a phosphonic group, as required by the instant claims. The present claims are directed to dendrimers comprising

bisphosphonic terminal groups, and these dendrimers cannot form gels. However the dendrimers of Caminade are required to be gel forming. Therefore the dendrimers claimed in the instant application are outside of the group of dendrimers taught by Caminade. The dendrimers of the instant invention cannot be anticipated by Caminade because if the structures were the same they would necessarily have the same properties.

The Office Action indicates that any of the dendrimers of Fig. (XI) including one of formula (III)



(III)

can be subsequently phosponated by adding the phosphonic groups to the P atom through conventional methods. This statement is purely speculative as the Office Action has not indicated such a disclosure in Caminade, which is required for an anticipation rejection. Neither has the Office Action supported this statement by reference to another document that discloses such a reaction.

Therefore the claims of the instant application are not anticipated by Caminade because Caminade does not disclose bisphosphonic terminals groups and discloses structures which are different from those of the instant claims.

Applicants respectfully submit that the claims are not anticipated by Caminade et al. and the rejection should be withdrawn.

2. Claims 54-57, 60-62, 70-73, 79, 80, 87 and 88 have been rejected under 35 U.S.C. §102(b) as being anticipated by Killat et al. (US 4,871,779).

Killat discloses a "dense star polymer having at least one dendritic branch emanating from a core with each dendritic branch having at least two terminal ion exchange moieties." (col. 2, lines 25-30). While phosphonate groups are listed among the many possible ion exchange moieties mentioned (col. 6, lines 59-71), bisphosphonic groups are not recited or suggested.

Killat teaches a process for the preparation of phosphonate moieties, but not bisphosphonate moieties. (col. 7, lines 19-24). The process disclosed by Killet is summarized below:

$$\text{Dendri-NH}_2 + \text{H}_2\text{CO} + \text{H-P(=O)(OR)}_2 \rightarrow \text{dendri-N[CH}_2\text{-P(=O)(OR}_2\text{)]}_2$$

or

$$\text{Dendri-NH}_2 + \text{Cl-CH}_2\text{-P(=O)(OR)}_2 \rightarrow \text{dendri-N[CH}_2\text{-P(=O)(OR}_2\text{)]}_2$$

It appears from the disclosure of Killat that the disclosed dendrimer comprises a central core and generation chains, with each generation chain terminated with a N atom linked to a $-CH_2-P(=O)(OR_2)_2$. The process used in Killat does not comprise the grafting of an intermediate chain. The dendrimer disclosed in Killat does not comprise an intermediate chain, as required by the claims of the instant application. Therefore the instant claims cannot be anticipated by Killat.

This can also be shown by comparing the process for the preparation of dendrimers of the instant invention with the disclosure of Killat. The instant

specification teaches the preparation of the claimed dendrimers from an intermediate (III):

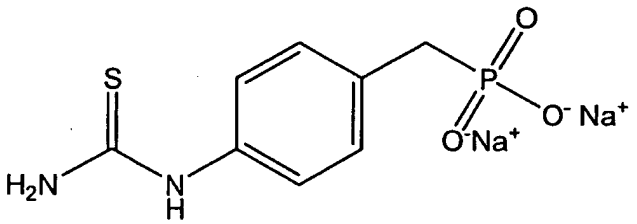
$$H\text{-}J\text{-}K\text{-}(Alk)_a\text{-}N<[A2\text{-}P(=O)(OX)_2]_d \quad (III)$$

where -J-K-$(Alk)_a$ is the intermediate chain. Grafting a compound of formula (III) to a dendrimer comprising a terminal NH_2 group, as disclosed in Killat, would necessarily lead to a dendrimer comprising generation chains and a distinct intermediate chain. Such a disclosure is not found in Killat. Therefore the instantly claimed dendrimers are distinct from those disclosed in Killat.

Applicants respectfully submit that the claims are not anticipated by Killat and the rejection should be withdrawn.

3. Claims 54-56, 58, 60-63, 70-73, 79- 83, 87 and 88 have been rejected under 35 U.S.C. §102(b) as being anticipated by Matthews et al. (US 6,464,971).

The Office Action indicates that Matthews discloses in Example 24 a dendritic polymer having a PAMAM (4.0) (generation 4) structure with a central core of ethylene diamine having terminal groups of the formula:



sodium 4-(phosphonomethyl)phenylisothiocyanate

Examples 24 and 25 of Matthews disclose dendrimers comprising a function:

-NH-C(=S)-NH-phenyl-P(=O)$(ONa)_2$
or
-NH-C(=S)-NH-phenyl-P(=O)(ONa)(OEt).

Each of this disclosed chains comprises a single phosphonic group, but does not comprise two phosponic groups on each chain, as required by the instant claims. Therefore the instant claims cannot be anticipated by Matthews.

The Office Action alleges (page 19, last 4 lines) that:

> During the reaction, at least some of the $-NH_2$ groups will react with two sodium 4-(phosphonomethyl)phenylisothiocyanate molecules, resulting in biphosphonic terminal groups.

Applicants respectfully submit that the Office Action is incorrect in making this statement. The product formed by reacting an $-NH_2$ group with a sodium 4-(phosphonomethyl)phenylisothiocyanate molecule would form:

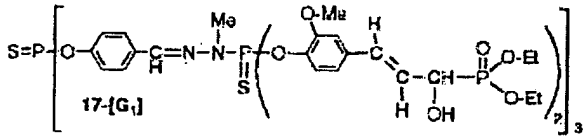
$$-NH-C(=S)-NH-phenyl-P(=O)-(OX)_2$$

The NH group in this structure is very stable and would not react with an additional 4-(phosphonomethyl)phenylisothiocyanate molecule. The allegation in the Office Action is merely speculative and the Office Action has failed to cite any references supporting such a reaction.

Applicants submit that the claims are not anticipated by Matthews because Matthews does not teach or disclose the bisphosphonic terminal groups required in the instant claims. Applicants respectfully request that the rejection be withdrawn.

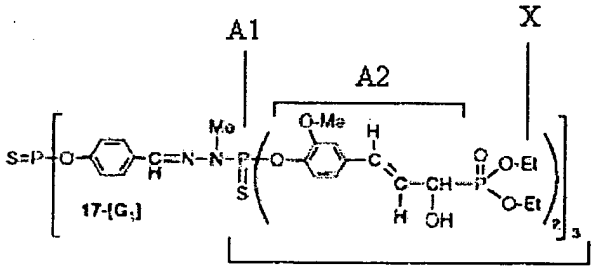
4. Claims 54, 58, 60-66, 68, 69 and 83 have been rejected under 35 U.S.C. §102(b) as being anticipated by Prévôté et al.. (J. Org. Chem. 1997, 62, 4834-4841)

The Office Action refers to Compound 17-[G1],



which is disclosed in Scheme 8 on page 4838. The Office Action indicates that these compounds correspond to the those of claim 54 of the instant application, where the biphosphonic terminal groups are in parenthesis and wherein A1 = P, A2 is -O-anisole-CH=CH-(OH) (a five membered hydroxy substituted hydrocarbon chain) and X = ethyl.

Compound 17-[G1} is shown below, with the locations and identities of the terminal group, A1, A2 and X, as recited in the instant claims, shown.



The definitions given in the Office Action are not allowed in the instant claims. The definition of A1 in the instant claims is:

-A1< represents the radical -CR< or –Heteroatom<.

A1 cannot represent the group P=S (and not P) as indicated in the Office Action.

Also the definition of A2, as recited in the Office Action, is not permitted in the instant claims. The definition of A2 in the instant claims is:

> the radicals A2, which are identical or different, each independently of the other represents a single bond or a linear or branched hydrocarbon chain having from 1 to 6 chain members, each of said chain members

optionally being selected from a heteroatom, each chain member being optionally substituted by one or more substituents selected from -Alkyl, -Hal, -NO_2, -NRR', -CN, -CF_3, -OH, -OAlkyl, -Aryl, and -Aralkyl;

The definition of A2 being -O-anisole-CH=CH-(OH) as recited in the Office Action cannot be present within the definition of A2 in the instant application. Applicants note that -O-anisole-CH=CH-(OH) is not a five membered hydroxy substituted hydrocarbon chain, as indicated in the Office Action, but rather comprises a phenyl group in the chain. A phenyl (aryl) group is not permitted within the chain under the definition of A2 in the instant application.

Applicants submit that the claims are not anticipated by Prévôté et al because Prévôté et al does not teach or disclose the bisphosphonic terminal groups required in the instant claims. Applicants respectfully request that the rejection be withdrawn.

In view of the foregoing, it is believed that entry of the proposed amendments should be allowed and that the record rejections cannot be maintained against the proposed claims once entered into this application. Further, favorable action in the form of a Notice of Allowance is believed to be next in order and is earnestly solicited.

Respectfully submitted,

BUCHANAN INGERSOLL & ROONEY PC

Date: November 6, 2008 By: Gary D. Mangels

Gary D Mangels, Ph.D.
Registration No. 55424

P.O. Box 1404
Alexandria, VA 22313-1404
703 836 6620